# Phase II and Phase III Archeological Database and Inventory

MARYLAND HISTORICAL TRUST

**Site Number:** 18BC89 **Site Name:** J.S. Berry Firebrick Pug Mill

Other name(s) J.S. Berry Firebrick Company Pug Mill

Prehistoric ☐ Historic ☑ Unknown ☐

**Brief Description:** mid- to late 19th century brickmaking factory/pug mill

## Site Location and Environmental Data:

Latitude 39.2840 Longitude -76.6202

Elevation 3 m Site slope 0-5%

Site setting

-Site Setting restricted

-Lat/Long accurate to within 1 sq. mile, user may need to make slight adjustments in mapping to account for sites near state/county lines or streams

Maryland Archeological Research Unit No. 14

Physiographic province Eastern Piedmont

Ethnobotany profile available ☐ Maritime site ☐

SCS soil & sediment code Ub

Terrestrial site ☑ Underwater site ☐

**Topography**

| | | | |
|---|---|---|---|
| Floodplain | ☐ | High terrace | ☐ |
| Hilltop/bluff | ☐ | Rockshelter/ cave | ☐ |
| Interior flat | ☑ | Hillslope | ☐ |
| Upland flat | ☐ | Unknown | ☐ |
| Ridgetop | ☐ | Other | ☐ |
| Terrace | ☑ | | |
| Low terrace | ☐ | | |

**Ownership**

| | |
|---|---|
| Private | ☐ |
| Federal | ☐ |
| State of MD | ☑ |
| Regional/ county/city | ☐ |
| Unknown | ☐ |

**Nearest Surface Water**

Name (if any) Middle Branch of Patapsco

| Saltwater | | Freshwater | |
|---|---|---|---|
| Ocean | ☐ | Stream/river | ☐ |
| Estuary/tidal river | ☑ | Swamp | ☐ |
| Tidewater/marsh | ☐ | Lake or pond | ☐ |
| | | Spring | ☐ |

Minimum distance to water is 305 m

## Temporal & Ethnic Contextual Data:

| | | | | | |
|---|---|---|---|---|---|
| Paleoindian site | | Woodland site | | Contact period site | | ca. 1820 - 1860 | Y |
| Archaic site | | MD Adena | | ca. 1630 - 1675 | | ca. 1860 - 1900 | Y |
| Early archaic | | Early woodland | | ca. 1675 - 1720 | | ca. 1900 - 1930 | |
| MIddle archaic | | Mid. woodland | | ca. 1720 - 1780 | | Post 1930 | |
| Late archaic | | Late woodland | | ca. 1780 - 1820 | | | |

Unknown prehistoric context ☐ Unknown historic context ☐ Unknown context ☐

**Ethnic Associations (historic only)**

| | | | |
|---|---|---|---|
| Native American | | Asian American | |
| African American | | Unknown | |
| Anglo-American | Y | Other | |
| Hispanic | | | |

**Y=Confirmed, P=Possible**

## Site Function Contextual Data:

**Prehistoric**

| | | | |
|---|---|---|---|
| Multi-component | ☐ | Misc. ceremonial | ☐ |
| Village | ☐ | Rock art | ☐ |
| Hamlet | ☐ | Shell midden | ☐ |
| Base camp | ☐ | STU/lithic scatter | ☐ |
| Rockshelter/cave | ☐ | Quarry/extraction | ☐ |
| Earthen mound | ☐ | Fish weir | ☐ |
| Cairn | ☐ | Production area | ☐ |
| Burial area | ☐ | Unknown | ☐ |

Other context ☐

**Historic**

Urban/Rural? Urban

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Domestic** | ☐ | Furnace/forge | ☐ | **Military** | ☐ | Post-in-ground | ☐ |
| Homestead | ☐ | Other | ☑ brick factory | Battlefield | ☐ | Frame-built | ☐ |
| Farmstead | ☐ | **Transportation** | ☐ | Fortification | ☐ | Masonry | ☑ |
| Mansion | ☐ | Canal-related | ☐ | Encampment | ☐ | Other structure | ☐ |
| Plantation | ☐ | Road/railroad | ☐ | **Townsite** | ☐ | **Slave related** | ☐ |
| Row/townhome | ☑ | Wharf/landing | ☐ | **Religious** | ☐ | **Non-domestic agri** | ☐ |
| Cellar | ☐ | Maritime-related | ☐ | Church/mtg house | ☐ | **Recreational** | ☐ |
| Privy | ☐ | Bridge | ☐ | Ch support bldg | ☐ | **Midden/dump** | ☐ |
| **Industrial** | ☑ | Ford | ☐ | **Burial area** | ☐ | **Artifact scatter** | ☐ |
| Mining-related | ☐ | **Educational** | ☐ | Cemetery | ☐ | **Spring or well** | ☐ |
| Quarry-related | ☐ | **Commercial** | ☐ | Sepulchre | ☐ | **Unknown** | ☐ |
| Mill | ☑ brick,pug,mu | Trading post | ☐ | Isolated burial | ☐ | **Other context** | ☐ |
| Black/metalsmith | ☐ | Store | ☐ | **Bldg or foundation** | ☐ | | |
| | | Tavern/inn | ☐ | Possible Structure | ☐ | | |

## Interpretive Sampling Data:

| **Prehistoric context samples** | | Soil samples taken | |
|---|---|---|---|
| Flotation samples taken | | Other samples taken | |

| **Historic context samples** | | Soil samples taken | N |
|---|---|---|---|
| Flotation samples taken | N | Other samples taken | Wood samples |

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## Diagnostic Artifact Data:

**Projectile Point Types**

| | | | |
|---|---|---|---|
| Clovis | | Koens-Crispin | |
| Hardaway-Dalton | | Perkiomen | |
| Palmer | | Susquehana | |
| Kirk (notch) | | Vernon | |
| Kirk (stem) | | Piscataway | |
| Le Croy | | Calvert | |
| Morrow Mntn | | Selby Bay | |
| Guilford | | Jacks Rf (notch) | |
| Brewerton | | Jacks Rf (pent) | |
| Otter Creek | | Madison/Potomac | |
| | | Levanna | |

**All quantities exact or estimated minimal counts**

**Prehistoric Sherd Types**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Marcey Creek | | Popes Creek | | Shepard | | Keyser | |
| Dames Qtr | | Coulbourn | | Townsend | | Yeocomico | |
| Selden Island | | Watson | | Minguannan | | Monongahela | |
| Accokeek | | Mockley | | Sullivan Cove | | Susquehannock | |
| Wolfe Neck | | Clemson Island | | Shenks Ferry | | | |
| Vinette | | Page | | Moyaone | | | |
| | | | | Potomac Cr | | | |

**Historic Sherd Types**

| | | | | | |
|---|---|---|---|---|---|
| **Earthenware** | | Ironstone | | Staffordshire | |
| Astbury | | Jackfield | | Tin Glazed | |
| Borderware | | Mn Mottled | | Whiteware | |
| Buckley | | North Devon | | **Porcelain** | |
| Creamware | | Pearlware | | | |

**Stoneware**

| | |
|---|---|
| English Brown | |
| Eng Dry-bodie | |
| Nottingham | |
| Rhenish | |
| Wt Salt-glazed | |

## Other Artifact & Feature Types:

**Prehistoric Artifacts**

| | | | |
|---|---|---|---|
| Flaked stone | | Other fired clay | |
| Ground stone | | Human remain(s) | ☐ |
| Stone bowls | | Modified faunal | |
| Fire-cracked rock | | Unmod faunal | |
| Other lithics (all) | | Oyster shell | ☐ |
| Ceramics (all) | | Floral material | ☐ |
| Rimsherds | | Uncommon Obj. | |
| | | Other ☐ | |

**Prehistoric Features**

| | | | |
|---|---|---|---|
| Mound(s) | | Storage/trash pit | ☐ |
| Midden | ☐ | Burial(s) | ☐ |
| Shell midden | ☐ | Ossuary | ☐ |
| Postholes/molds | ☐ | Unknown | ☐ |
| House pattern(s) | ☐ | Other | ☐ |
| Palisade(s) | ☐ | | |
| Hearth(s) | ☐ | | |
| Lithic reduc area | ☐ | | |

**Lithic Material**

| | | | | | |
|---|---|---|---|---|---|
| Fer quartzite | ☐ | Sil sandstone | ☐ | | |
| Jasper | ☐ | Chalcedony | ☐ | European flint | ☐ |
| Chert | ☐ | Ironstone | ☐ | Basalt | ☐ |
| Rhyolite | ☐ | Argilite | ☐ | Unknown | ☐ |
| Quartz | ☐ | Steatite | ☐ | Other | ☐ |
| Quartzite | ☐ | Sandstone | ☐ | | |

☑ **Dated features present at site**

19th century horse-drawn pug mill, 20th century steam-powered mills

**Historic Artifacts**

| | | | |
|---|---|---|---|
| Pottery (all) | | Tobacco related | |
| Glass (all) | | Activity item(s) | |
| Architectural | | Human remain(s) | ☐ |
| Furniture | | Faunal material | ☑ |
| Arms | | Misc. kitchen | |
| Clothing | | Floral material | ☐ |
| Personal items | | Misc. | 200 |
| | | Other ☐ | |

**Historic Features**

| | | | | | |
|---|---|---|---|---|---|
| Const feature | ☐ | Privy/outhouse | ☐ | Depression/mound | ☐ |
| Foundation | ☐ | Well/cistern | ☐ | Burial(s) | ☐ |
| Cellar hole/cellar | ☐ | Trash pit/dump | ☐ | Railroad bed | ☐ |
| Hearth/chimney | ☐ | Sheet midden | ☐ | Earthworks | ☐ |
| Postholes/molds | ☐ | Planting feature | ☐ | Mill raceway | ☐ |
| Paling ditch/fence | ☐ | Road/walkway | ☐ | Wheel pit | ☐ |

Unknown ☐ Other ☑

wooden platform of a pug mill or mud mill

**All quantities exact or estimated minimal counts**

## Radiocarbon Data:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample 1:** | +/- | years BP | Reliability | **Sample 2:** | +/- | years BP | Reliability | **Sample 3:** | +/- | years BP | Reliability |
| **Sample 4:** | +/- | years BP | Reliability | **Sample 5:** | +/- | years BP | Reliability | **Sample 6:** | +/- | years BP | Reliability |
| **Sample 7:** | +/- | years BP | Reliability | **Sample 8:** | +/- | years BP | Reliability | **Sample 9:** | +/- | years BP | Reliability |

☐ **Additional radiocarbon results available**

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**Brief Description:** mid- to late 19th century brickmaking factory/pug mill

**External Samples/Data:**

Collection curated at MAC

☐ Additional raw data may be available online

**Summary Description:**

The Berry Brick Mill (18BC89) site consists of the archeological remains associated with the mid-late 19th century J.S. Berry Firebrick Pug Mill in the Camden Yards area of downtown Baltimore. The site was situated in Block #925 at what was formerly the intersection of Russell and Hamburg Streets, but today is the site of the Baltimore Ravens' football stadium (also known as M&T Bank Stadium). Most of the area surrounding the site is heavily developed today. Soils mapped for the area are classified as "Urban Land" meaning that 80% of the surface is covered either by buildings or by impervious surfaces such as asphalt or concrete.

Baltimore Block #925, in which the site is located, was annexed to the city in 1783. By the end of the 18th century, property lines and streets had been established in this area. A 1792 survey of the area reveals that at least two dwellings occupied lots in the eastern and western halves of Block 925.

During the first half of the 19th century, ownership of property in this area appears to have been speculative. Very few lots were developed or improved, but tax records indicate that a John W. Berry was operating a brick kiln at Russell and Hamburg Streets as early as 1838. The Berry family's major brickmaking operations were at that time located elsewhere. It was not until the 1850s that John S. and George Berry moved major operations to Block #925.

An 1851 map of the city depicts only 3 structures within Block #925 (one of which is the brick kiln). But by 1858, John and George Berry had acquired all of Block #925 except for James W. Pawley's lot (on which he operated a stoneware kiln – see synopsis for 18BC88). By the 1870s, the Berry's enterprise dominated the entire block. The Pawley property was subdivided and developed into townhomes during the middle and late 19th century. Tax assessment maps for 1876 show that the brickworks occupied the entire section east of Claret Alley, and that John, George, and William Berry controlled approximately 2/3 of the block west of Claret Alley. However, the lots on Russell Street were identified as "unimproved", indicating that the 1838 brick kiln had been removed. Sanborn fire insurance maps show that new brick sheds later were constructed on these lots.

Due to its proximity to the Patapsco River and the Chesapeake Bay, the Camden Yards area historically contained large deposits of marine and alluvial clays. These readily available clay deposits rendered the area a prime location for brickmaking enterprises. Brickmaking was a major industry in Baltimore from the 18th through 20th centuries. Brickmaking families such as the Albrights, Berrys, Krebs, Nagles, Russells, and Warners originally controlled much of the real estate in the vicinity.

Five principal stages were involved in the brick-making process: 1) mining (known as "Winning"), 2) the preparation of the clays, 3) molding (known as "Forming"), 4) drying, and 5) firing (known as "Burning"). After the clay was mined from pits, it first was weathered by being permitted to lie exposed during the winter. This process removed soluble salts from the clay, and broke down the harder lumps in the matrix. Next, the clay was tempered to make it pliable and to give it an even consistency. Various materials such as sand, grog, ash, or ground chalk could be added during this phase to reduce shrinkage of the final product. The mixing of the various materials was accomplished in a pug mill. The tempering process was followed by the molding. Until the late 19th century, molding was done by hand in wooden or iron clad molds, and the process required skilled workers. The molded bricks then were dried, and, finally, fired in a kiln.

According to the J.S. Berry Brick Company's own promotional literature, the Berry family's involvement in Baltimore's brick making industry dated to ca. 1812. An early 19th century directory listing showed a J. and T.L. Berry, "fireproof brick man," located on South Sharp Street, near Hill, within the modern-day Sharp-Leadenhall district. Although tax records indicate that John W. Berry operated a brick kiln at Russell and Hamburg Streets as early as 1838, the family's major brickmaking operation probably moved to this location during the late 1850s.

The 1890 Sanborn-Perris Fire Insurance Map of the Berry Brick Works shows that the complex included several unidentified single-storey frame structures, two or three kilns (both wood and coal-fired), a brick oven, several single-storey brick sheds, a tool house, brick floors, and four clay pits. Both horse-powered and steam-powered pug mills were used to temper the clays. Because the company manufactured fire brick, special care had to be taken to ensure that the final size and shape of the brick was uniform. Usually, ground brick known as grog was added to clays intended for fire brick to reduce shrinkage during drying and high quality fire bricks frequently included more than one type of clay.

The company utilized several drying processes for its bricks. Sanborn Maps showed two single-storey drying sheds on the Berry property between Claret Alley and Russell Street, as well as two "brick floors" adjacent to the main kilns. Drying sheds had hinged roofs and open sides to allow maximum air circulation in good weather. Using this process, bricks could be dry enough for firing within two to three weeks. Brick "floors" were heated areas on which green bricks were stacked to speed up the drying process. Heat was delivered to the floor by means of flues from the nearby kilns.

The site was first examined archeologically in 1989 during a Phase I study at Baltimore's Camden Yards. The 85 acre project area incorporated a 71-block portion of the former Camden Yards Industrial Park, the site of the (then) planned Oriole's Park at Camden Yards, and of a second stadium: a planned professional football stadium for the Baltimore Ravens. At that time the Ravens were a newly formed NFL team created by relocating the former Cleveland Brown's franchise to the city of Baltimore. The project was conducted in compliance with Maryland Historic Preservation Legislation, Article 83B, Sections 617-618.

The survey covered a large swath of the Camden Yards area. It was examined through a combination of pedestrian survey, the mechanical excavation of 88 test trenches, and the hand excavation of 5 formal test units (apparently 1 X 1 m in size). In the vicinity of 18BC89, three trenches (numbered 82, 83, and 84) were excavated to test for evidence of row houses, or the J.S. Berry Brickyard that preceded them. Two features were identified in Trench 82. These were brick-lined, steam-powered pug mills shown on the 1890 Sanborn Fire Insurance Maps of the area. Both features were filled with olive yellow sandy clay with brick rubble and slag, and they were overlain by 20-30 cm of dark yellowish brown sandy loam topsoil. An additional feature also was exposed within Trench 84: a mortared stone wall positioned parallel to Hamburg Street. The wall was interpreted as the foundation of a late 19th century rowhouse constructed in this area of the property. These rowhouses had no basements, and had not impacted subsurface archeological remains of the Berry operation.

Stratigraphy within Trench 83 consisted of 15-20 cm of sandy loam topsoil over 30-60 cm of mottled sandy clay fill. A large wooden structure was encountered at approximately 70 cm below surface. It was designated Feature 8301. Archival evidence showed this to be a horse-powered pug mill operated by the J.S. Berry Brick Company. Trench 83 subsequently was extended to expose one quarter of this feature. With a diameter of approximately 6.4 m, and with portions

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Prehistoric ☐ Historic ☑ Unknown ☐

**Brief Description:** mid- to late 19th century brickmaking factory/pug mill

of its wooden paddles intact, the JS Berry Brick Company pug mill represents a primary example of how American brickmakers adapted earlier technologies to meet the demands of a mass economy. The remaining un-exposed portions of the pug mill were left undisturbed and preserved in situ.

Artifacts recovered from the overburden at Site 18BC89 represented the cultural remains associated with late 19th and 20th century domestic occupations of the site, and from subsequent fill episodes. With the exception of 15 fragments of wood obtained from the upper strata of Trench 83, and a brick stamped "Berry's PREMIUM Firebrick", none of the material could be related directly to the operation of the J.S. Berry Brick Company.

Two hundred artifacts (all cataloged in the table above as miscellaneous) were recovered from Site 18BC89 during the 1989 study. Kitchen-related and architectural materials dominated the collection recovered from the upper fill strata of Trenches 82-84. Food preparation and storage materials comprised between 30.4% and 81.5%, architectural material represented between 11.1% and 41.3% of the artifacts recovered from these contexts. Although a few fragments of pearlware and 19th century domestic grey saltglazed stoneware were recovered from the overburden, whiteware and ironstone were found most frequently. Architectural materials obtained from the surface layers included electrical wiring, bathroom tile, roofing or paving slate, brick, window glass, and cut nails. The overlying strata near the brickyard pug mill were associated with the occupation and destruction of the rowhouses that stood at this location.

The assemblage recovered from the pug mill (Feature 8301) replicated the artifact patterns observed within the overlying strata. Forty-three artifacts were recovered from Feature 8301. Architectural (11 objects or 21%) and kitchen (41 objects or 77%) materials composed almost the entire assemblage. The kitchen category contained faunal material, ceramics, and glass. Ironstone was the most common ceramic type encountered.

The relative lack of artifacts that could be associated with brickyard operation, and the late 19th century domestic character of the feature fill, suggest that the pug mill was filled in to level the area during the late 19th century. The origin of this fill was not identified, but the lack of brickyard-related materials indicated that its source was outside the immediate area of the brickyard.

Based on the findings from the Phase I study, Phase III data recovery was recommended at 18BC89 before construction of the football stadium.

Researchers returned to the site in 1996 to conduct Phase III data recovery prior to the construction of the new Baltimore Ravens' Stadium. No previously unidentified features or deposits were exposed during the 1996 study. Remnants of the associated steam powered mills located south of the horse-powered mill were identified and recorded during the Phase I study, however, these features retained little integrity and their industrial early 20th century manufacturing context had been compromised by later construction and landscape modifications. No evidence was found at that time of the steam powered mill shown on Sanborn Fire Insurance Maps to the west of the wooden mill. The 1996 study verified intensive disturbance in the surrounding area. The remnants of the two southernmost features having been previously recorded, the 1996 study focused exclusively on the archeological documentation of the remaining wooden pug mill structure.

To thoroughly document the horse-drawn pug mill, an area covering approximately 10 X 10 m, was cleared of overlying fill deposits and hand excavated to expose 100% of the wooden superstructure. The overlying fill materials were removed mechanically in 30 cm levels to expose the entire feature. Fill materials and clays associated directly with the feature were removed manually.

Once exposed, the wooden mill structure was cleaned and documented through scaled drawing and large-format photography. The wooden structure was examined closely for evidence of construction techniques. Any visible evidence was documented graphically and photographically. Wood samples were retained for species identification. Soil samples were not retained because the majority of soils associated with the feature were historic or recent filling materials, not primary deposits associated with the operations of the brick works. Upon completion of recordation, a portion of the wooden deck was removed and the soil matrix and underlying structural supports were examined and recorded. Samples of wood and nails were retained for both species analysis (for the wood) and dating (based on nail form and plank cutting techniques).

Once exposed in its entirety, it was apparent that portions of the circular wooden pug mill had been impacted by later construction. These impacts included a pipe trench that extended diagonally across a portion of the northeastern quadrant of the structure, and a stone foundation wall that intersected the extreme northern arc of the circle. Additionally, the impressions of horizontal boards attached to evenly spaced upright posts were noted in the overlying fill materials at the western edge of the circular platform. These represented the original exterior wall of the wooden basin of the mill.

Three collapsed trapezoidal wooden structures were documented lying on the mill floor. The impressions of uprights and vertical planking were also noted along the exterior. Precise measurement and comparison of these elements revealed that the intact wooden constructions were collapsed portions of the exterior wall. Their trapezoidal shape was intended to create an out-flaring wall.

Reconstruction from the precise measurements taken showed that the pug mill is the remains of a large, shallow, round tub measuring 8.44m in diameter and 50 cm deep. It had a roughly circular 2.40 m diameter opening at its center. The floor of the tub was composed of 33 individual pine planks that had been flat-sawn, using a circular saw, to an average thickness of 2.75 cm and width of 26 cm. A slightly raised lip is present around the central opening and the exterior edge. This feature may have been created intentionally as part of construction, or it may have resulted from use-wear.

A geometrically complex sub-floor platform was present beneath the planking. This portion of the feature was constructed of rough-hewn oak and pine logs set on a prepared ground of fine sand. The individual sub-floor timbers measured 15-27 cm in diameter, and 85 to 233 cm in length. The ends of these timbers had been cut diagonally to fit the circle, and did not appear to have been fastened to one another. The lower surface of some of these timbers was notched, suggesting that they had been hand hewn, and reused from another structure. The overlying platform was fastened to these timbers using 25 cm long, machine cut, hand-finished spikes (ca. 1840). The locations and dimensions of the uprights and vertical planking indicated that the floor had been encircled by a low, outward flaring wall constructed of a series of short, trapezoidal sections that measured approximately 102 cm at the base and 114 cm at the top.

The wooden structure identified at 18BC89 represents an isolated remnant to the Berry Brick Company works that occupied this portion of the block from about 1850 to 1890. The Berry operation was relatively large, but not as large as some others in Baltimore, such as Reiers, Russell, and Company. The Berry operation made fire bricks for the Baltimore-Washington market in the period just prior to the development of mass production. The pug mill represents the second of five stages of brick manufacturing: mining, preparation, molding, drying, and firing. The mills, first horse-drawn, then steam powered, and mechanized, were used to mix tempering agents with the raw clays after they had weathered, and before they were molded. Archeological investigations indicated that the wooden remains represented the base and sides of a large wooden tub, constructed of pine planks, and resting on a subfloor made of

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reused oak beams. A mechanism for mixing the raw clay with tempering agents, similar to that shown in patent drawings, would have rested over the central opening in the plank floor. This mechanism would have been powered by a horse or mule hitched to a sweep.

Site 18BC89 was clearly a significant archeological resource. The data recovery in 1996 and the preceding work adequately documented the site. The construction of the Baltimore Ravens stadium resulted in the destruction of any remaining components of the site, thus, it no longer has any research potential.

**External Reference Codes (Library ID Numbers):**

00005647, 00005693